

CLAIM AMENDMENTS

Please replace the claims with the following:

1. (Currently amended) A method of determining a fluid inflow profile along the length of a permeable inflow region of an underground wellbore, the method comprising the steps of:

- transferring heat into or from the permeable inflow region of the wellbore during a well shut in period such that at least a substantial-part of the inflow region has a temperature which is different from the temperature of the surrounding formation;

- starting production of hydrocarbon fluids via said permeable inflow region;

- measuring substantially simultaneously the temperature of the fluids at various points along at least part of the length of the inflow region; and

- determining at selected intervals of time after production start up a temperature profile along at least part of the length of the inflow region on the basis of the thus measured temperatures;

wherein the method further comprises determining a fluid inflow profile along the length of said inflow region on the basis of a comparison of the determined temperature profiles at selected intervals after production start up, ~~wherein at least a substantial part of the permeable inflow region is heated during the well shut in period and wherein during an initial period of time after starting production of hydrocarbons via said permeable inflow region~~ said heat transfer into or from ~~heating of the permeable inflow region is continued and wherein during a subsequent period of time following said initial period~~ said heat transfer ~~heating of the permeable inflow region is~~ interrupted, and the temperature is measured both during said initial and subsequent periods of time and wherein differences between the temperature variation over time measured during said initial and subsequent period are used to determine a heat capacity of the inflowing fluid.

2. (Currently amended) The method of claim 1, wherein a comparison of the temperature profiles determined at the selected intervals ~~the level of temperature variation per unit of time is~~ used as an indicator of the level of influx of fluid at various points along the length of said inflow region.

3. (Currently amended) The method of claim 2, wherein the inflow profile is determined such that if at a specific location the measured temperature variation over time is higher than at adjacent locations along the length of the permeable inflow region ~~the thus measured peak in the~~ higher temperature variation per unit of time is used as an indicator that at said specific location the influx of fluids is higher than at said adjacent locations, whereas if at another specific location the measured temperature variation per unit of time is lower than at adjacent locations along the length of the permeable inflow region ~~the thus measured dip in the~~ lower temperature variation per unit of time is used as an indicator that at said other specific location the influx of fluids is lower than at said adjacent locations.

4. (Original) The method of claim 1, wherein a ratio of the temperature variation over time measured during the initial period and during the subsequent period is determined for various points along the length of the inflow region and wherein said ratio is used as an indicator of the heat capacity of the fluid flowing into the well.

5. (Original) The method of claim 4, wherein a relatively high ratio between the temperature variation measured during the initial and subsequent periods is used as an indicator that the inflowing fluid has a relatively low heat capacity and a relatively high gas content.

6. (Currently amended) The method of claim 1, wherein the permeable inflow region is heated by an electrical heater cable extending along at least a ~~substantial part~~ of the length of the permeable inflow region and wherein the temperature is measured by

means of a fiber optical temperature sensor extending along at least a substantial-part of the length of the permeable inflow region.

7. (Original) The method of claim 6, wherein the fiber optical temperature sensor is strapped to the outer surface of the electrical heater cable.

8. (Original) The method of claim 6, wherein the electrical heater cable comprises an electrical conductor which is surrounded by a mineral insulation layer comprising a compacted mineral powder, which layer is enclosed in an annular metal sheath, and the fiber optical sensor is embedded in a channel extending through the mineral insulation layer.

9. (Currently amended) A method of producing crude oil from a subterranean formation, wherein the influx of fluids into the well is determined or adjusted to an optimal level on the basis of the method, comprising the steps of:

- transferring heat into or from the permeable inflow region of the wellbore during a well shut in period such that at least a substantial-part of the inflow region has a temperature which is different from the temperature of the surrounding formation,
- starting production of hydrocarbon fluids via said permeable inflow region;
- measuring substantially simultaneously the temperature of the fluids at various points along at least part of the length of the inflow region; and
- determining at selected intervals of time after production start up a temperature profile along at least part of the length of the inflow region on the basis of the thus measured temperatures;

wherein the method further comprises determining a fluid inflow profile along the length of said inflow region on the basis of a comparison of the determined temperature profiles at selected intervals after production start up, ~~wherein at least a substantial part of the permeable inflow region is heated during the well shut in period and wherein during an initial period of time after starting production of hydrocarbons via said permeable inflow region~~ said heat transfer into or from ~~heating of the permeable~~

inflow region is continued and wherein during a subsequent period of time following said initial period said heat transfer ~~heating of the permeable inflow region is~~ interrupted, and the temperature is measured both during said initial and subsequent periods of time and wherein differences between the temperature variation over time measured during said initial and subsequent period are used to determine a heat capacity of the inflowing fluid.

10. (Currently amended) A heater and distributed temperature sensing system suitable for use in the method, comprising the steps of:

- means for transferring heat into or from a ~~the~~ permeable inflow region of the wellbore during a well shut in period such that at least a substantial part of the inflow region has a temperature that ~~which is~~ different from the temperature of the surrounding formation;

- means for producing ~~starting production of~~ hydrocarbon fluids via said permeable inflow region;

- means for measuring substantially simultaneously the temperature of the fluids at various points along at least part of the length of the inflow region; and

- means for determining at selected intervals of time after production start up a temperature profile along at least part of the length of the inflow region on the basis of the thus measured temperatures;

means for controlling said heat transfer means, said producing means, said temperature measuring means, and said temperature profile determining means such that wherein the method further comprises determining a fluid inflow profile along the length of said inflow region is determined on the basis of a comparison of the determined temperature profiles determined at selected intervals after production start up, such that ~~wherein~~ at least a substantial part of the permeable inflow region is heated during the well shut-in period, such that ~~and wherein~~ during an initial period of time after starting production of hydrocarbons via said permeable inflow region said heat transfer into or from ~~heating of the permeable inflow region is~~ continued and ~~wherein~~ during a subsequent period of time following said initial period said heat

~~transfer heating of the permeable inflow region is interrupted, and~~ and such that the
temperature is measured both during said initial and subsequent periods of time and
~~wherein differences between the temperature variation over time measured during said~~
initial and subsequent period are used to determine a heat capacity of the inflowing
fluid; and

_____ ~~comprising a~~ one or more mineral insulated heater cables, which each
comprise an electrical conductor ~~which is surrounded by a mineral insulation layer~~
comprising an compacted mineral powder, which layer is enclosed in an annular metal
sheath; and

_____ a fiber optical distributed temperature sensor extending ~~which extends along~~
at least a substantial part of the length of one or more mineral insulated heater cables .

11. (Original) The heated and distributed temperature sensing system of claim
10, wherein at least one fiber optical distributed temperature sensor extends through a
channel extending through the mineral insulation layer of at least one of the mineral
insulated heater cables.